



FCC Test Report

Test Report
On Behalf of
MICRO COMPUTER (HK) TECH LIMITED
For
Mini PC

Model No.: X1 Pro-370, X1 Pro-365, X1 Pro-*****: where* =
"0-9", "A-Z", "-", "space"

FCC ID: 2A49R-X1PRO

Prepared For: **MICRO COMPUTER (HK) TECH LIMITED**
RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan Chai, HK,
HONG KONG, China

Prepared By: **Shenzhen HUAKE Testing Technology Co., Ltd.**
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping,
Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Date of Test: **Jan. 10, 2025 ~ Feb. 07, 2025**

Date of Report: **Feb. 21, 2025**

Report Number: **HK2501100235-5E**



Test Result Certification

Applicant's Name: MICRO COMPUTER (HK) TECH LIMITED

Address: RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront,
Wan Chai, HK, HONG KONG, China

Manufacturer's Name: MICRO COMPUTER (HK) TECH LIMITED

Address: RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront,
Wan Chai, HK, HONG KONG, China

Product Description

Trade Mark: N/A

Product Name: Mini PC

Model and/or Type Reference : X1 Pro-370, X1 Pro-365, X1 Pro-*****: where* = "0-9",
"A-Z", "-", "space"

Standards: FCC Rules and Regulations Part 15 Subpart E Section 15.407
ANSI C63.10: 2013

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen HUAKE Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen HUAKE Testing Technology Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Date of Test.....:

Date (s) of Performance of Tests.....: Jan. 10, 2025 ~ Feb. 07, 2025

Date of Issue: Feb. 21, 2025

Test Result: Pass

Testing Engineer :

(Len Liao)

Technical Manager :

(Sliver Wan)

Authorized Signatory :

(Jason Zhou)



Table of Contents

1. Test Result Summary	5
1.1 Test Procedures and Results.....	5
1.2 Information of the Test Laboratory	5
1.3 Measurement Uncertainty	6
2. EUT Description	7
2.1 General Description of EUT	7
2.2 Operation Frequency Each of Channel.....	8
2.3 Operation of EUT during Testing.....	8
2.4 Description of Test Setup.....	9
2.5 Description of Support Units	10
3. General Information.....	11
3.1 Test Environment and Mode	11
4. Test Results and Measurement Data	18
4.1 Conducted Emission.....	18
4.2 Maximum Conducted Output Power	22
4.3 6dB Emission Bandwidth	26
4.4 26dB Bandwidth and 99% Occupied Bandwidth	47
4.5 Power Spectral Density	48
4.6 Band Edge.....	70
4.7 Spurious Emission.....	97
4.8 Frequency Stability Measurement.....	128
4.9 Antenna Requirement.....	130
5. Photographs of Test Setup.....	131
6. Photos of the EUT.....	133



**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Feb. 21, 2025	Jason Zhou



1. Test Result Summary

1.1 Test Procedures and Results

Requirement	CFR 47 Section	Result
Antenna Requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Maximum Conducted Output Power	§15.407(a)	PASS
6dB Emission Bandwidth	§15.407(e)	PASS
26dB Emission Bandwidth & 99% Occupied Bandwidth	§15.407(a)	N/A
Power Spectral Density	§15.407(a)	PASS
Band Edge	§15.407(b)/15.209/15.205	PASS
Radiated Emission	§15.407(b)/15.209/15.205	PASS
Frequency Stability	§15.407(g)	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

1.2 Information of the Test Laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization:

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.



1.3 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 0.37\text{dB}$
2	RF Power, Conducted	$\pm 3.35\text{dB}$
3	Spurious Emissions, Conducted	$\pm 2.20\text{dB}$
4	All Emissions, Radiated(<1G)	$\pm 3.90\text{dB}$
5	All Emissions, Radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^{\circ}\text{C}$
7	Humidity	$\pm 1.0\%$



2. EUT Description

2.1 General Description of EUT

Equipment	Mini PC
Model Name	X1 Pro-370
Series Model	X1 Pro-365, X1 Pro-*****: where* = "0-9", "A-Z", "-", "space"
Model Difference	The difference between each model is only due to the different sales area and the model name is different, the other circuit principle, safety structure and key components are the same, the difference does not affect the safety and electromagnetic compatibility performance of the product. Test sample model: X1 Pro-370.
Trade Mark	N/A
FCC ID	2A49R-X1PRO
Operation Frequency	IEEE 802.11a/n/ac(HT20)/ax(HE20)/be(EHT20): 5.745GHz-5.825GHz IEEE 802.11n/ac(HT40)/ax(HE40)/be(EHT40): 5.755GHz-5.795GHz IEEE 802.11ac(HT80)/ax(HE80)/be(EHT80): 5.775GHz
Modulation Technology	IEEE 802.11a/n/ac/ax/be
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only 1024QAM for OFDMA in 11ax mode only 4096QAM for OFDMA in 11be mode only
Antenna Type	FPC antenna
Antenna Gain	Antenna 1: 3.40dBi Antenna 2: 3.25dBi MIMO: 6.34dBi
Power Source	AC100-240V, 50/60Hz, 1.8A
Power Supply	AC100-240V, 50/60Hz, 1.8A
Hardware Version	V1.0
Software Version	V1.0
Note: 1. The EUT incorporates a MIMO function. Physically, it provides two completed transmitters and receivers (2T2R), two transmit signals are completely correlated, then, Direction gain= GANT + Array Gain (Array Gain=10 log(2) dB for power spectral density; Array Gain=0 for power measurement). 2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 3. Antenna gain Refer to the antenna specifications. 4. The cable loss data is obtained from the supplier. 5. The test results in the report only apply to the tested sample.	



2.2 Operation Frequency Each of Channel

802.11a/802.11n(HT20)/ 802.11ac(HT20)/ 802.11ax(HE20)/ 802.11be(EHT20)		802.11n(HT40)/ 802.11ac(HT40)/ 802.11ax(HE40)/ 802.11be(EHT40)		802.11ac(HT80)/ 802.11ax(HE80)/ 802.11be(EHT80)	
Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

2.3 Operation of EUT during Testing

Band IV (5725 - 5850 MHz)		
For 802.11a/n(HT20)/ac(HT20)/ax(HE20)/be(EHT20)		
Channel Number	Channel	Frequency (MHz)
149	Low	5745
157	Mid	5785
165	High	5825

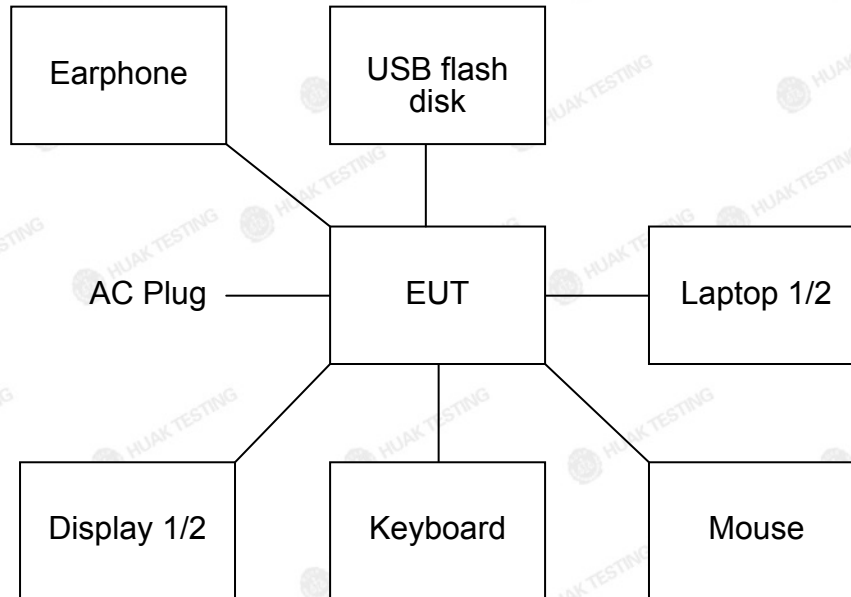
For 802.11n(HT40)/ac(HT40)/ax(HE40)/be(EHT40)		
Channel Number	Channel	Frequency (MHz)
151	Low	5755
159	High	5795

For 802.11ac(HT80)/ax(HE80)/be(EHT80)		
Channel Number	Channel	Frequency (MHz)
155	/	5775

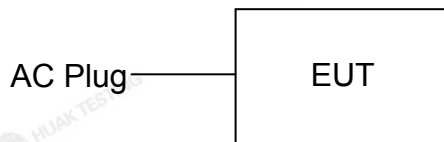


2.4 Description of Test Setup

Operation of EUT during Conducted and Radiation below 1GHz testing:



Operation of EUT during Radiation Above 1GHz testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.



2.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Remark
1	Mini PC	N/A	X1 Pro-370	N/A	EUT
2	Laptop 1	Lenovo	TP00096A	Input: DC 20V, 2.25~3.25A Output: 5VDC, 0.5A	Peripheral
3	Laptop 2	Lenovo	TP00096A	Input: DC 20V, 2.25~3.25A Output: 5VDC, 0.5A	Peripheral
4	Display 1	AOC	280LM00004	N/A	Peripheral
5	Display 2	PHILIPS	279E1	N/A	Peripheral
6	Keyboard	N/A	N/A	N/A	Peripheral
7	Mouse	N/A	N/A	N/A	Peripheral
8	Earphone	N/A	N/A	N/A	Peripheral
9	USB flash disk	N/A	N/A	N/A	Peripheral

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



3. General Information

3.1 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering Mode:	Keep the EUT in continuous transmitting by select channel and modulations
The sample was placed 0.8m/1.5m for blow/above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	
Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.	
Mode	Data rate
802.11a	6 Mbps
802.11n(HT20)	MCS0
802.11n(HT40)	MCS0
802.11ac(HT20)/ac(HT40)/ac(HT80)	MCS0
802.11ax(HE20)/ax(HE40)/ax(HE80)	MCS0
802.11be(EHT20)/be(EHT40)/be(EHT80)	MCS0
Final Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation



3. Mode Test Duty Cycle

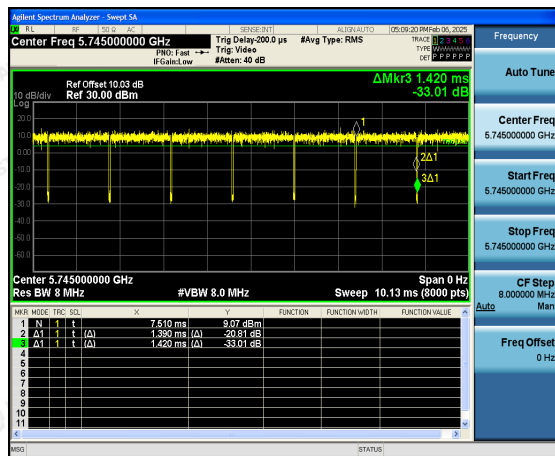
ANT.1:

Mode	Duty Cycle
802.11a	0.979
802.11n(HT20)	0.979
802.11n(HT40)	0.979
802.11ac(HT20)	0.972
802.11ac(HT40)	0.979
802.11ac(HT80)	0.979
802.11ax(HE20)	0.979
802.11ax(HE40)	0.979
802.11ax(HE80)	0.979
802.11be(EHT20)	0.979
802.11be(EHT40)	0.972
802.11be(EHT80)	0.972

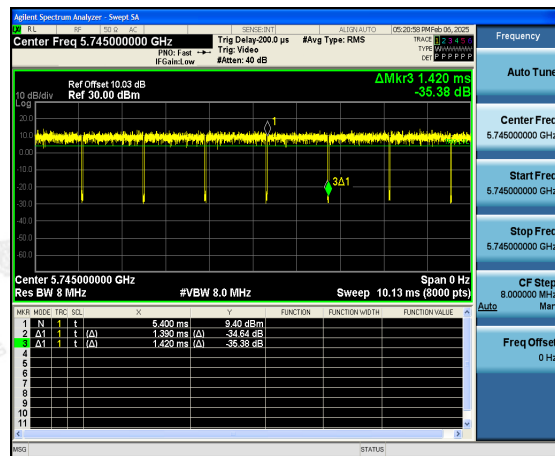


Test plots as follows:

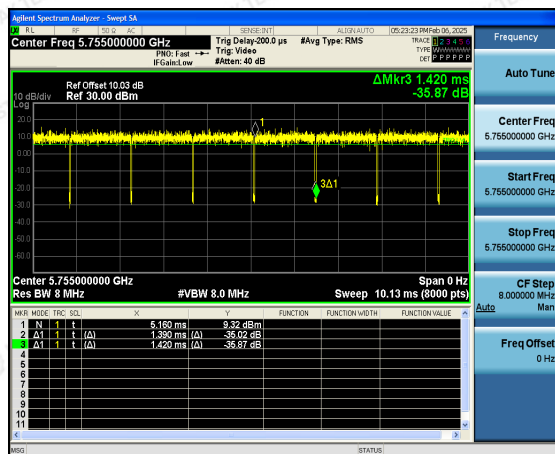
802.11a



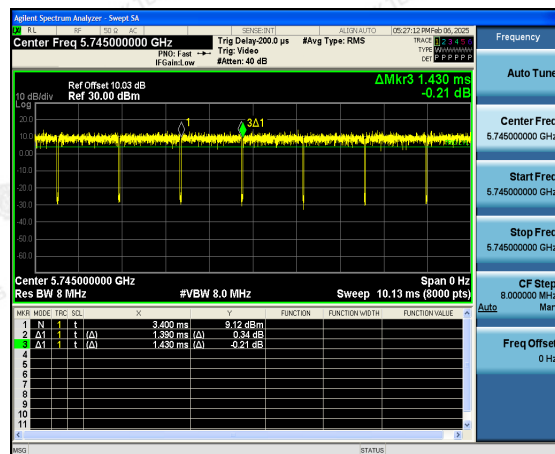
802.11n(HT20)



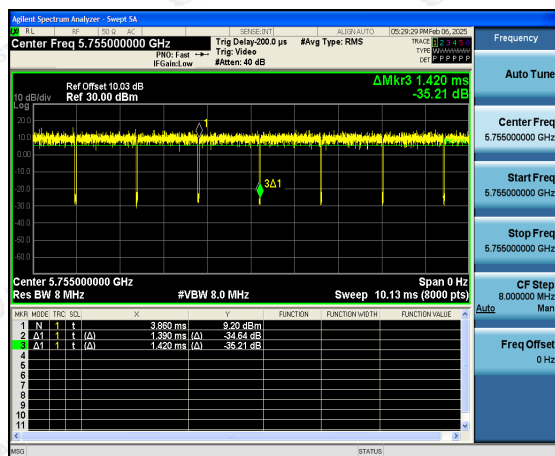
802.11n(HT40)



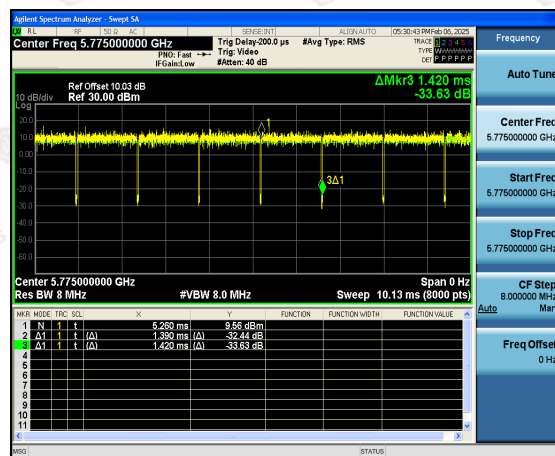
802.11ac(HT20)



802.11ac(HT40)

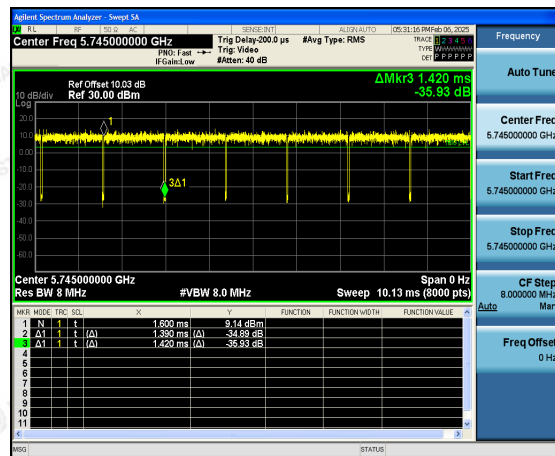


802.11ac(HT80)

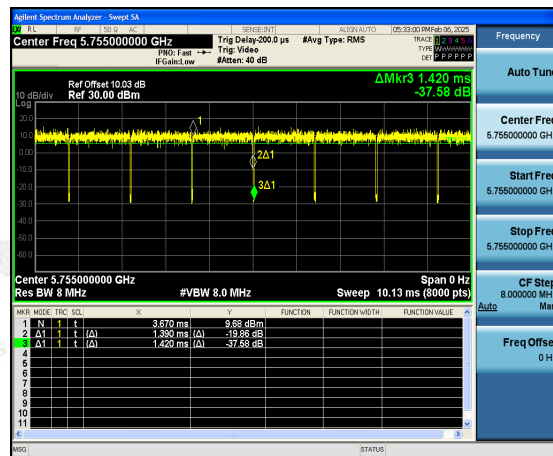




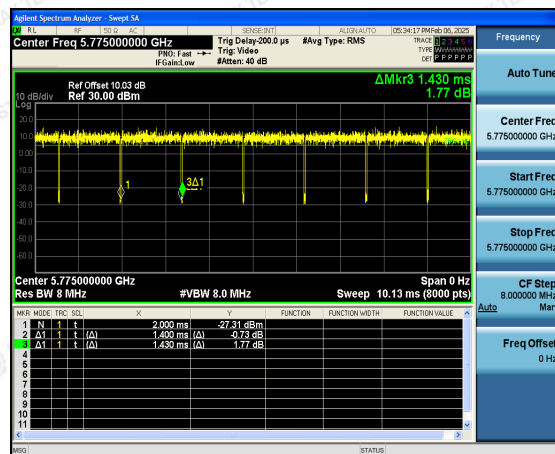
802.11ax(HE20)



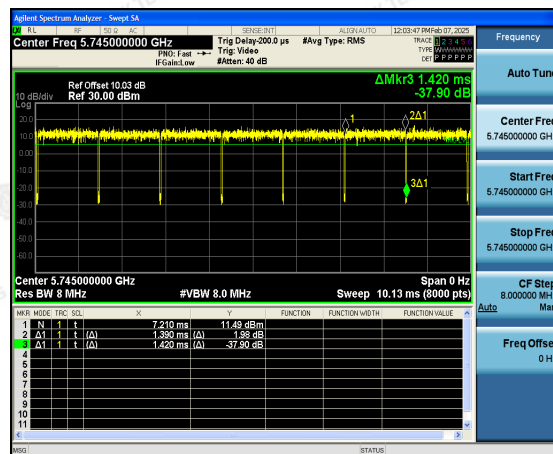
802.11ax(HE40)



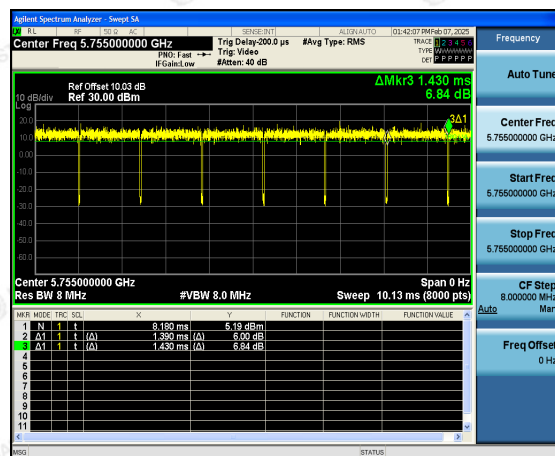
802.11ax(HE80)



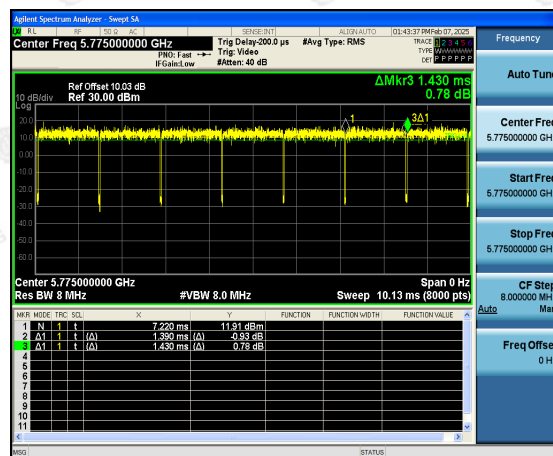
802.11be(EHT20)



802.11be(EHT40)



802.11be(EHT80)





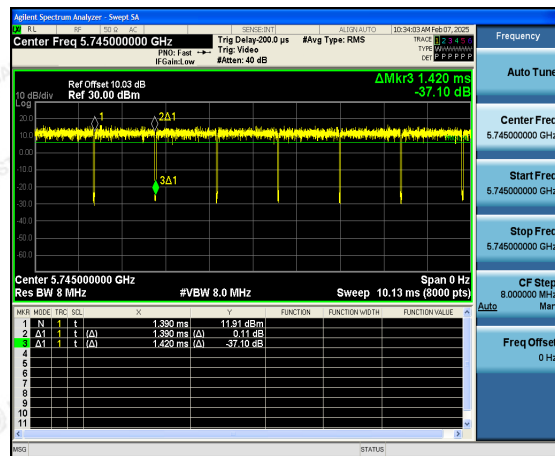
ANT.2:

Mode	Duty Cycle
802.11a	0.979
802.11n(HT20)	0.979
802.11n(HT40)	0.972
802.11ac(HT20)	0.972
802.11ac(HT40)	0.972
802.11ac(HT80)	0.979
802.11ax(HE20)	0.972
802.11ax(HE40)	0.979
802.11ax(HE80)	0.979
802.11be(EHT20)	0.979
802.11be(EHT40)	0.979
802.11be(EHT80)	0.979

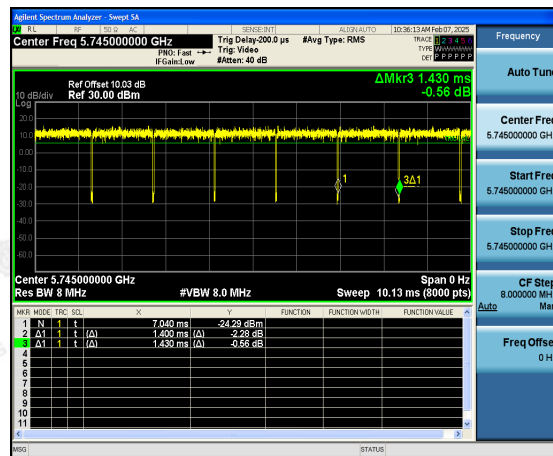


Test plots as follows:

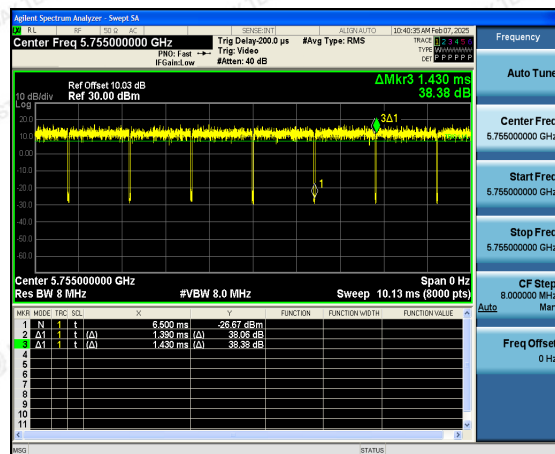
802.11a



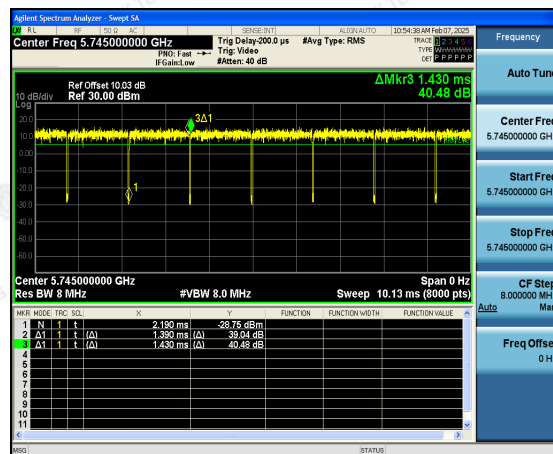
802.11n(HT20)



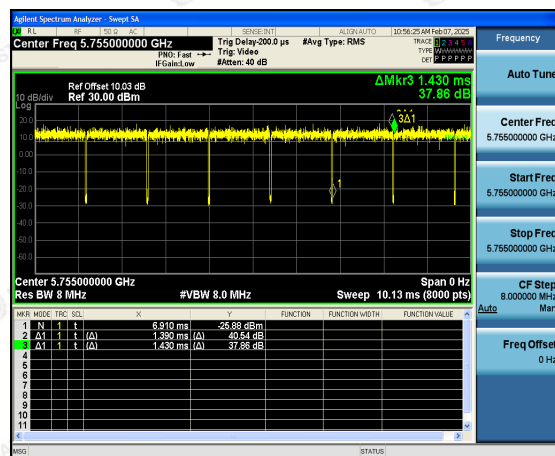
802.11n(HT40)



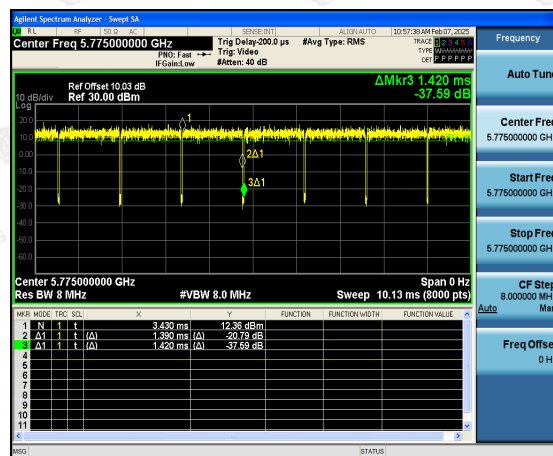
802.11ac(HT20)



802.11ac(HT40)

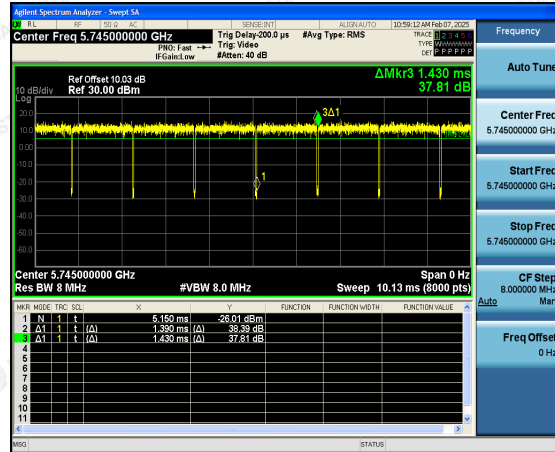


802.11ac(HT80)

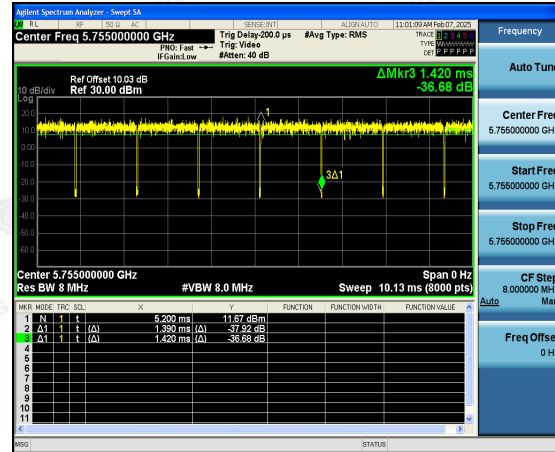




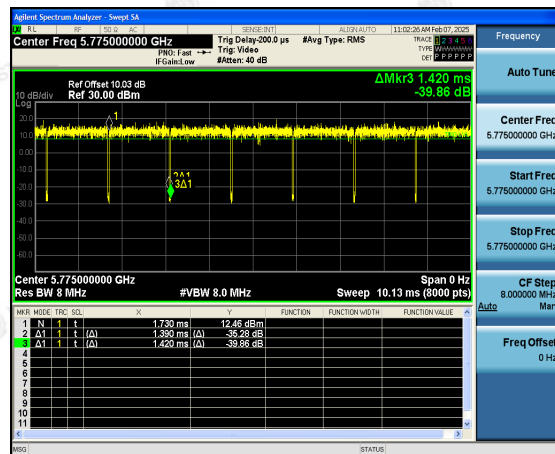
802.11ax(HE20)



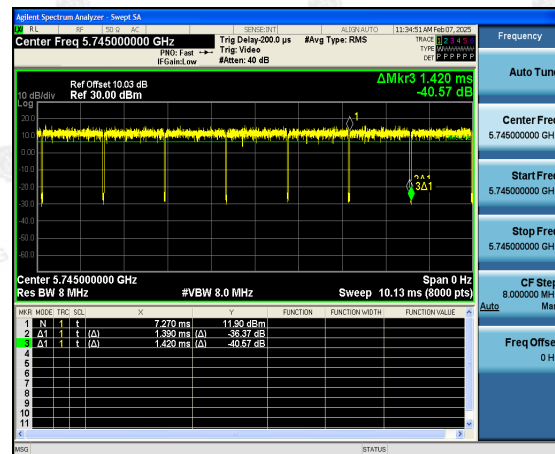
802.11ax(HE40)



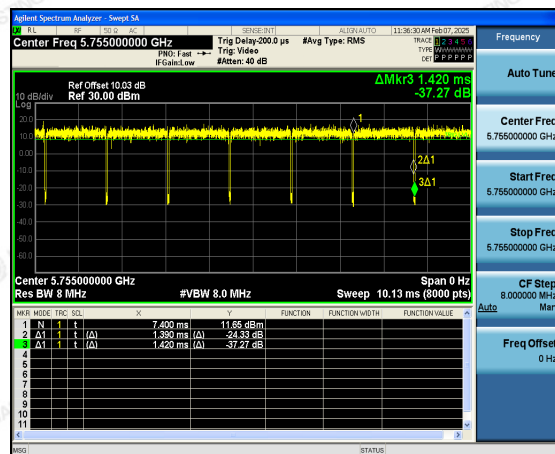
802.11ax(HE80)



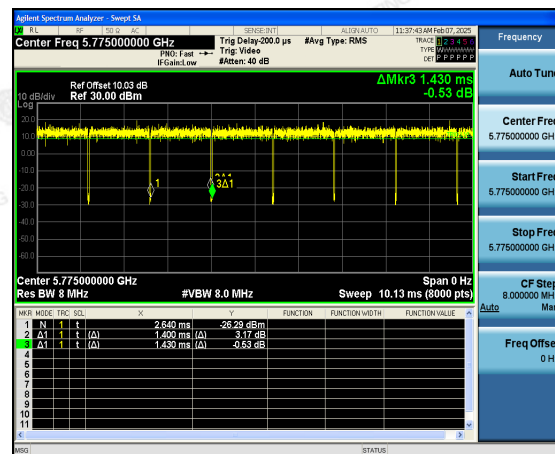
802.11be(EHT20)



802.11be(EHT40)



802.11be(EHT80)





4. Test Results and Measurement Data

4.1 Conducted Emission

4.1.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test Setup:	Reference Plane 40cm E.U.T AC power 80cm LISN Filter AC power Test table/Insulation plane EMI Receiver Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m														
Test Mode:	Tx Mode														
Test Procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.														
Test Result:	Pass														



4.1.2 Test Instruments

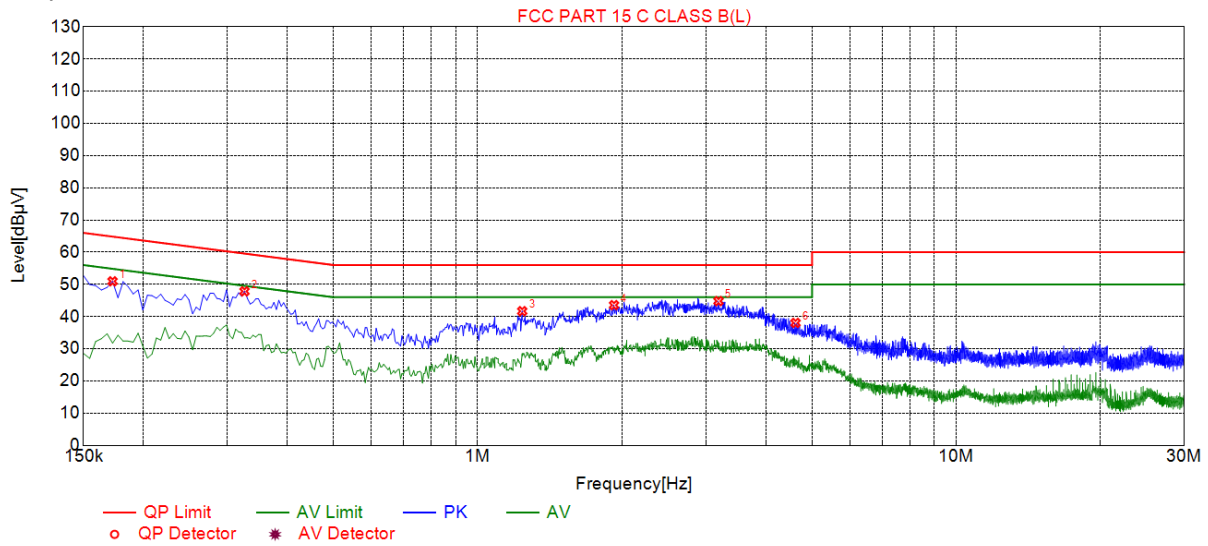
Conducted Emission Shielding Room Test Site (843)					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Receiver	R&S	ESR	HKE-005	Feb. 20, 2024	Feb. 19, 2025
LISN	R&S	ENV216	HKE-002	Feb. 20, 2024	Feb. 19, 2025
LISN	R&S	ENV216	HKE-059	Feb. 20, 2024	Feb. 19, 2025
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Feb. 20, 2024	Feb. 19, 2025
EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	N/A	N/A
10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	Feb. 20, 2024	Feb. 19, 2025

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.1.3 Test Data

Test Specification: Line



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1725	50.95	19.84	64.84	13.89	31.11	PK	L
2	0.3255	47.84	19.85	59.57	11.73	27.99	PK	L
3	1.2390	41.68	19.90	56.00	14.32	21.78	PK	L
4	1.9275	43.55	19.96	56.00	12.45	23.59	PK	L
5	3.1875	44.80	20.06	56.00	11.20	24.74	PK	L
6	4.6185	38.03	20.10	56.00	17.97	17.93	PK	L

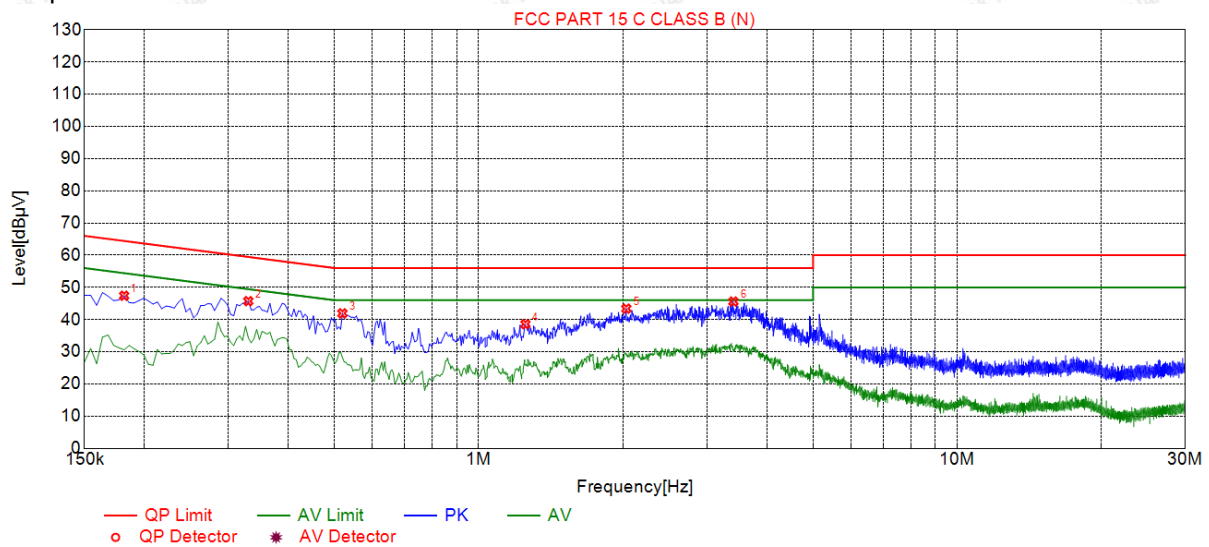
Remark: Margin = Limit – Level

Correction factor = Cable loss + ISN insertion loss

Level = Test receiver reading + correction factor



Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1815	47.41	19.75	64.42	17.01	27.66	PK	N
2	0.3300	45.72	19.74	59.45	13.73	25.98	PK	N
3	0.5190	41.94	19.73	56.00	14.06	22.21	PK	N
4	1.2525	38.56	19.77	56.00	17.44	18.79	PK	N
5	2.0355	43.39	19.84	56.00	12.61	23.55	PK	N
6	3.4080	45.60	19.96	56.00	10.40	25.64	PK	N

Remark: $\text{Margin} = \text{Limit} - \text{Level}$

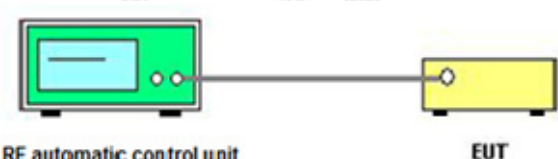
Correction factor = Cable loss + ISN insertion loss

Level = Test receiver reading + correction factor



4.2 Maximum Conducted Output Power

4.2.1 Test Specification

Test Requirement:	FCC Part15 E Section 15.407(a)	
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02.r01 Section E	
Limit:	Frequency Band (MHz)	Limit
	5725-5850	1 W
Test Setup:	 RF automatic control unit EUT	
Test Mode:	Transmitting mode with modulation	
Test Procedure:	1. The testing follows the Measurement Procedure of KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E, 3, a 2. The RF output of EUT was connected to the RF automatic control unit by RF cable. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Measure the conducted output power and record the results in the test report.	
Test Result:	PASS	
Remark:	Conducted output power= measurement power $+10\log(1/x)$ X is duty cycle=1, so $10\log(1/1)=0$ Conducted output power= measurement power	



4.2.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
Power meter	Agilent	E4419B	HKE-085	Feb. 20, 2024	Feb. 19, 2025
Power Sensor	Agilent	E9300A	HKE-086	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.2.3 Test Data

Configuration Band IV (5725 - 5850 MHz)					
Mode	Test channel	Maximum Conducted Output Power (dBm)		Limit (dBm)	Result
		Antenna port 1	Antenna port 2		
802.11a	CH149	5.76	5.10	30	PASS
802.11a	CH157	5.24	6.10	30	PASS
802.11a	CH165	6.00	5.61	30	PASS
802.11n(HT20)	CH149	5.21	5.51	30	PASS
802.11n(HT20)	CH157	5.60	6.20	30	PASS
802.11n(HT20)	CH165	6.23	5.66	30	PASS
802.11n(HT40)	CH151	5.10	5.12	30	PASS
802.11n(HT40)	CH159	5.06	5.45	30	PASS
802.11ac(HT20)	CH149	5.35	5.53	30	PASS
802.11ac(HT20)	CH157	5.29	5.92	30	PASS
802.11ac(HT20)	CH165	5.39	5.11	30	PASS
802.11ac(HT40)	CH151	4.73	4.55	30	PASS
802.11ac(HT40)	CH159	4.54	5.13	30	PASS
802.11ac(HT80)	CH155	4.63	4.57	30	PASS
802.11ax(HE20)	CH149	5.64	5.39	30	PASS
802.11ax(HE20)	CH157	5.13	5.43	30	PASS
802.11ax(HE20)	CH165	5.59	5.38	30	PASS
802.11ax(HE40)	CH151	4.62	4.74	30	PASS
802.11ax(HE40)	CH159	4.25	5.16	30	PASS
802.11ax(HE80)	CH155	4.50	4.80	30	PASS
802.11be(EHT20)	CH149	5.47	4.32	30	PASS
802.11be(EHT20)	CH157	5.17	5.10	30	PASS
802.11be(EHT20)	CH165	5.55	5.53	30	PASS
802.11be(EHT40)	CH151	4.80	4.73	30	PASS
802.11be(EHT40)	CH159	5.16	4.93	30	PASS
802.11be(EHT80)	CH155	4.91	5.17	30	PASS



Configuration Band IV (5725 - 5850 MHz)						
Mode	Test channel	Maximum Conducted Output Power (dBm)			Limit (dBm)	Result
		Antenna port 1	Antenna port 2	MIMO		
802.11n(HT20)	CH149	5.21	5.51	8.37	30	PASS
802.11n(HT20)	CH157	5.60	6.20	8.92	30	PASS
802.11n(HT20)	CH165	6.23	5.66	8.96	30	PASS
802.11n(HT40)	CH151	5.10	5.12	8.12	30	PASS
802.11n(HT40)	CH159	5.06	5.45	8.27	30	PASS
802.11ac(HT20)	CH149	5.35	5.53	8.45	30	PASS
802.11ac(HT20)	CH157	5.29	5.92	8.63	30	PASS
802.11ac(HT20)	CH165	5.39	5.11	8.26	30	PASS
802.11ac(HT40)	CH151	4.73	4.55	7.65	30	PASS
802.11ac(HT40)	CH159	4.54	5.13	7.86	30	PASS
802.11ac(HT80)	CH155	4.63	4.57	7.61	30	PASS
802.11ax(HE20)	CH149	5.64	5.39	8.53	30	PASS
802.11ax(HE20)	CH157	5.13	5.43	8.29	30	PASS
802.11ax(HE20)	CH165	5.59	5.38	8.50	30	PASS
802.11ax(HE40)	CH151	4.62	4.74	7.69	30	PASS
802.11ax(HE40)	CH159	4.25	5.16	7.74	30	PASS
802.11ax(HE80)	CH155	4.50	4.80	7.66	30	PASS
802.11be(EHT20)	CH149	5.47	4.32	7.94	30	PASS
802.11be(EHT20)	CH157	5.17	5.10	8.15	30	PASS
802.11be(EHT20)	CH165	5.55	5.53	8.55	30	PASS
802.11be(EHT40)	CH151	4.80	4.73	7.78	30	PASS
802.11be(EHT40)	CH159	5.16	4.93	8.06	30	PASS
802.11be(EHT80)	CH155	4.91	5.17	8.05	30	PASS



4.3 6dB Emission Bandwidth

4.3.1 Test Specification

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section C
Limit:	>500kHz
Test Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. 4. Measure and record the results in the test report.
Test Result:	PASS

4.3.2 Test Instruments

RF Test Room

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.3.3 Test Data

ANT. 1

Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	CH149	5745	15.080	0.5	PASS
802.11a	CH157	5785	15.120	0.5	PASS
802.11a	CH165	5825	15.320	0.5	PASS
802.11n(HT20)	CH149	5745	15.080	0.5	PASS
802.11n(HT20)	CH157	5785	15.120	0.5	PASS
802.11n(HT20)	CH165	5825	15.120	0.5	PASS
802.11n(HT40)	CH151	5755	35.040	0.5	PASS
802.11n(HT40)	CH159	5795	35.040	0.5	PASS
802.11ac(HT20)	CH149	5745	15.320	0.5	PASS
802.11ac(HT20)	CH157	5785	15.120	0.5	PASS
802.11ac(HT20)	CH165	5825	15.120	0.5	PASS
802.11ac(HT40)	CH151	5755	35.040	0.5	PASS
802.11ac(HT40)	CH159	5795	35.040	0.5	PASS
802.11ac(HT80)	CH155	5775	75.200	0.5	PASS
802.11ax(HE20)	CH149	5745	15.120	0.5	PASS
802.11ax(HE20)	CH157	5785	15.840	0.5	PASS
802.11ax(HE20)	CH165	5825	16.800	0.5	PASS
802.11ax(HE40)	CH151	5755	35.360	0.5	PASS
802.11ax(HE40)	CH159	5795	35.120	0.5	PASS
802.11ax(HE80)	CH155	5775	75.200	0.5	PASS
802.11be(EHT20)	CH149	5745	17.720	0.5	PASS
802.11be(EHT20)	CH157	5785	17.240	0.5	PASS
802.11be(EHT20)	CH165	5825	16.520	0.5	PASS
802.11be(EHT40)	CH151	5755	35.440	0.5	PASS
802.11be(EHT40)	CH159	5795	36.080	0.5	PASS
802.11be(EHT80)	CH155	5775	75.200	0.5	PASS

Test plots as follows:

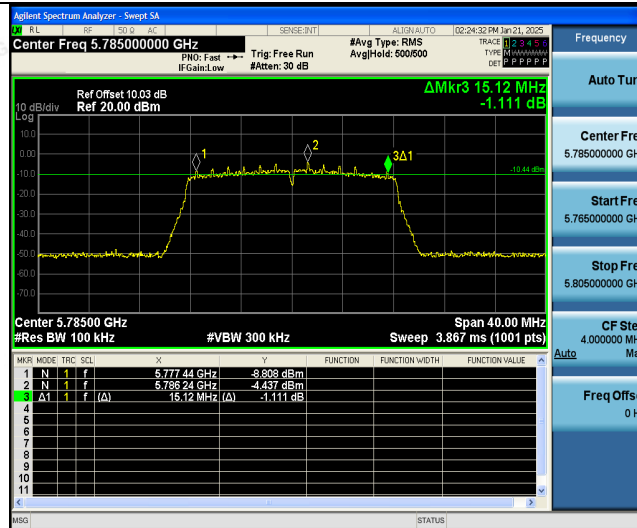


Band IV (5725 – 5850 MHz)

802.11a



Low



Mid



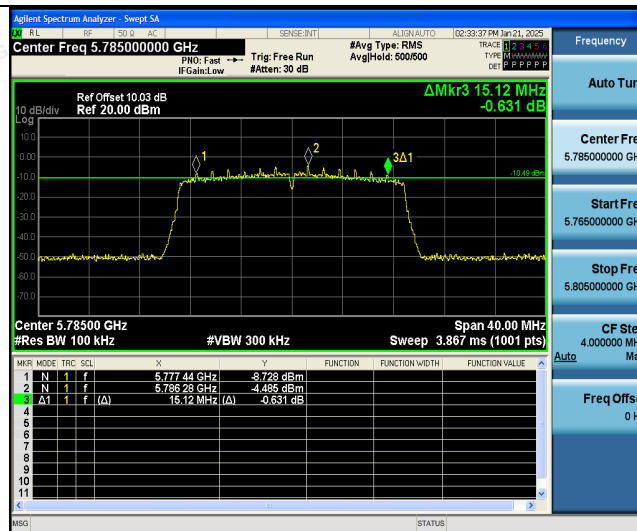
High



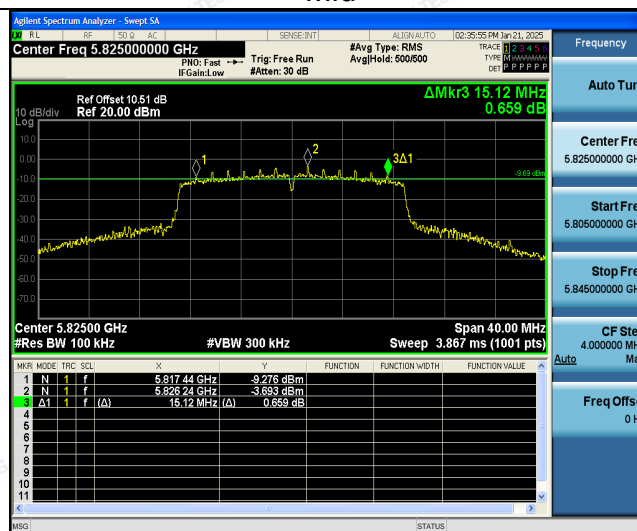
802.11n(HT20)



Low



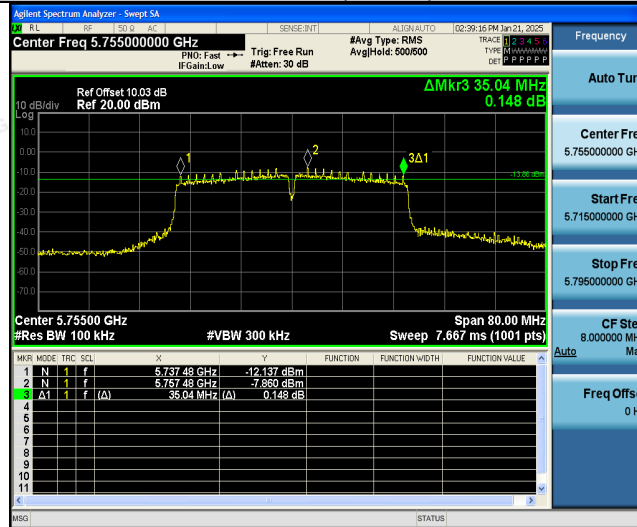
Mid



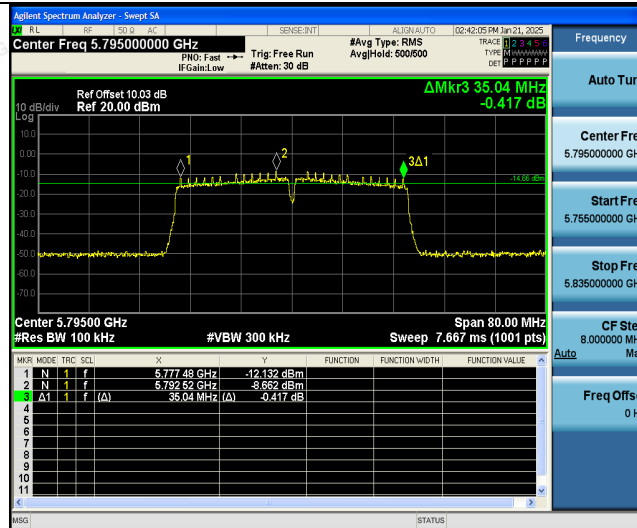
High



802.11n(HT40)



Low



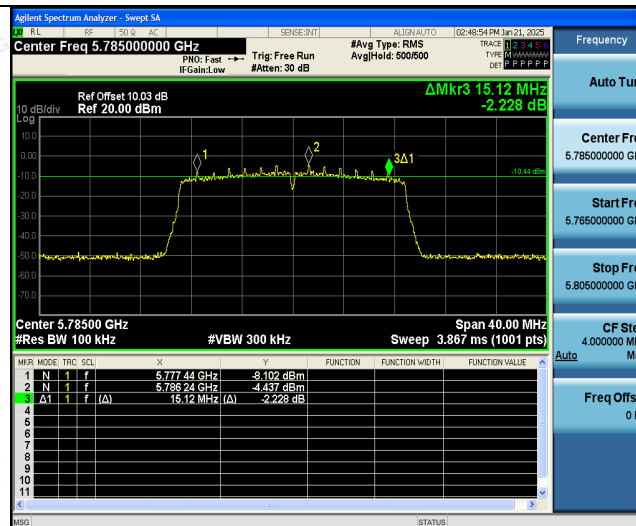
High



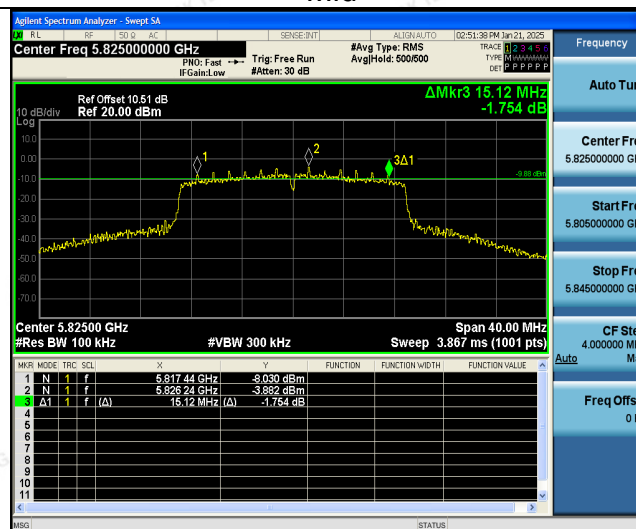
802.11ac(HT20)



Low



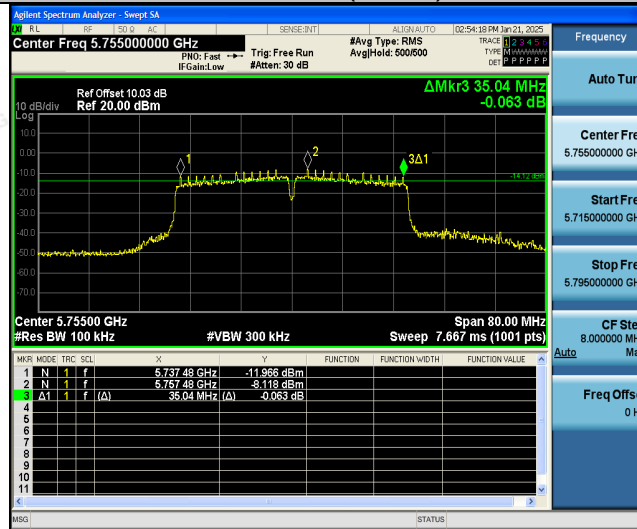
Mid



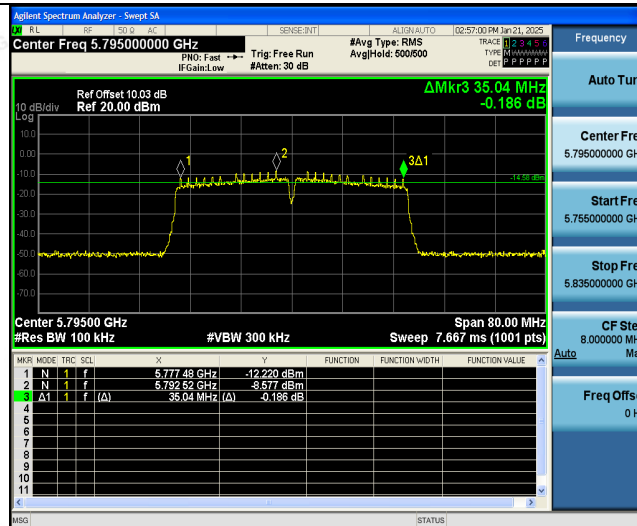
High



802.11ac(HT40)



Low



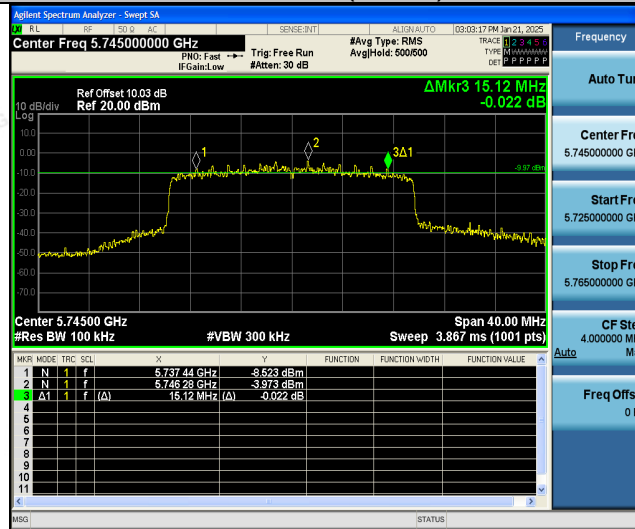
High

802.11ac(HT80)

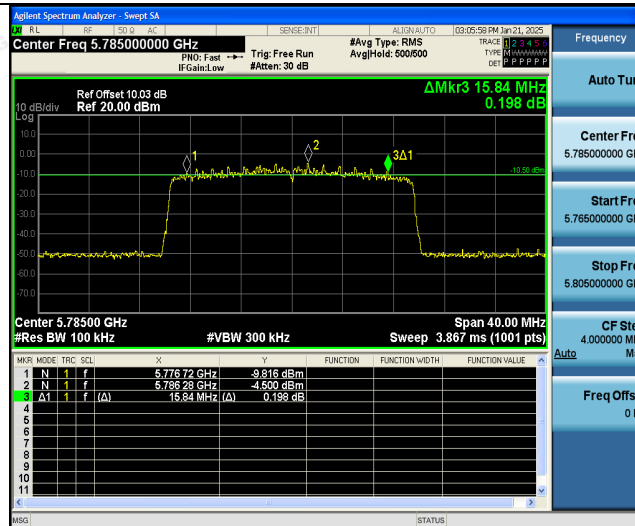




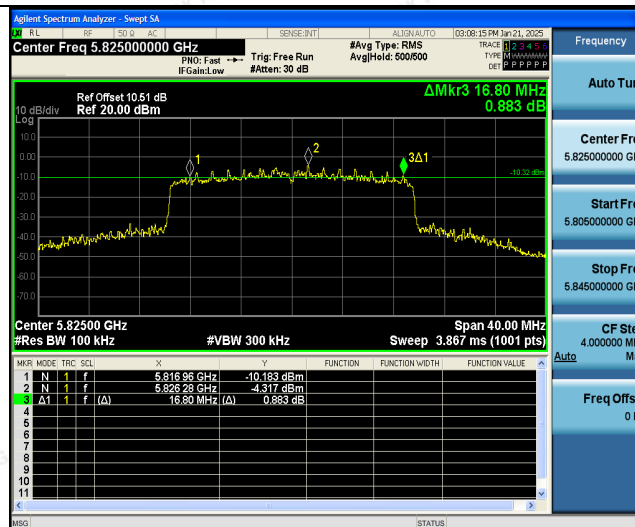
802.11ax(HE20)



Low



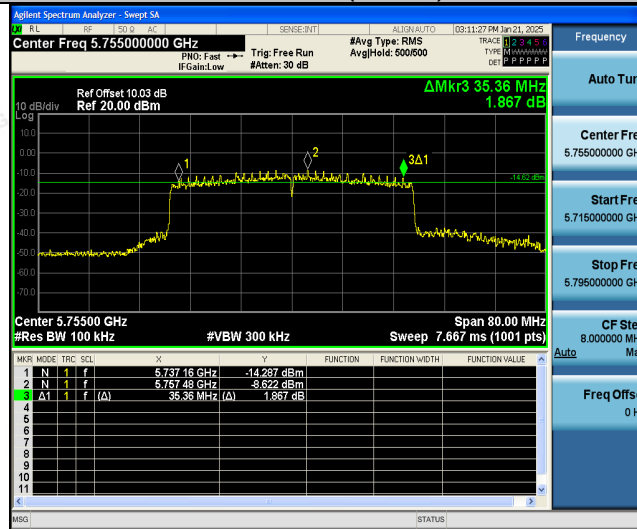
Mid



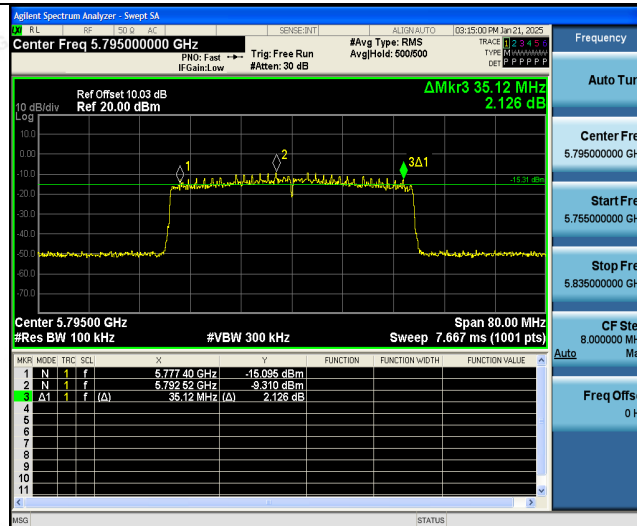
High



802.11ax(HE40)

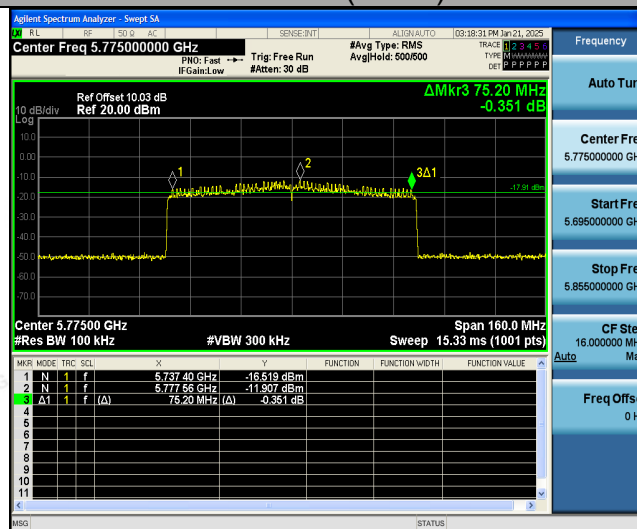


Low



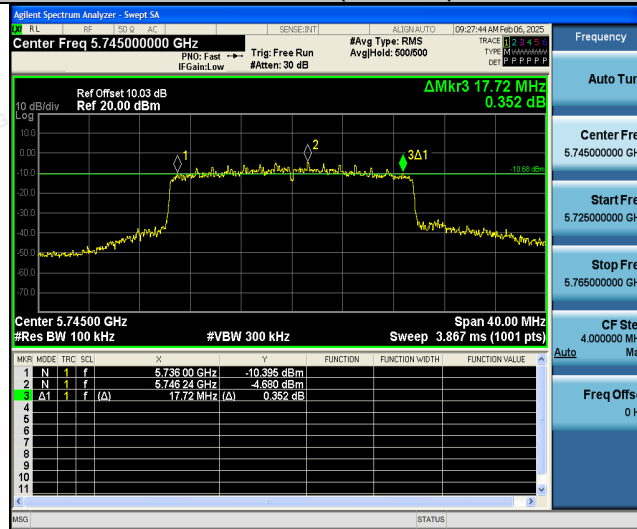
High

802.11ax(HE80)

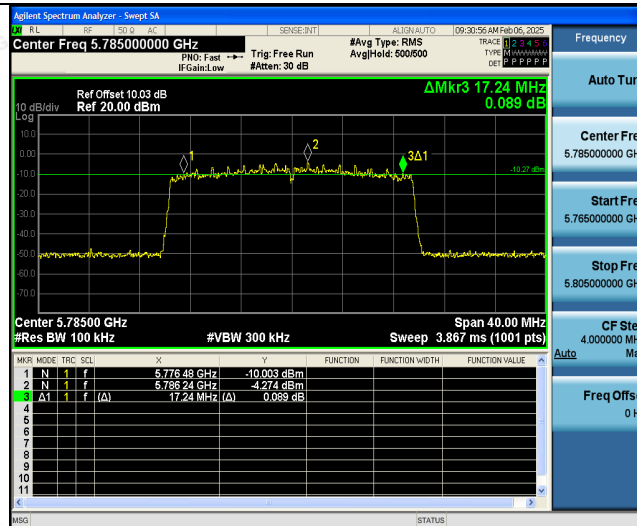




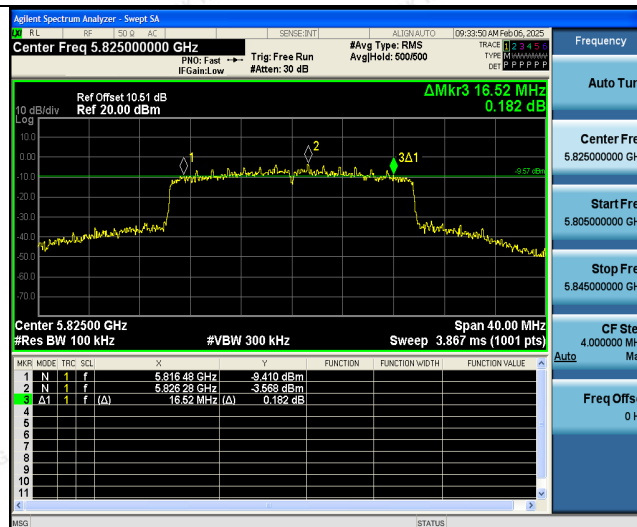
802.11be(EHT20)



Low



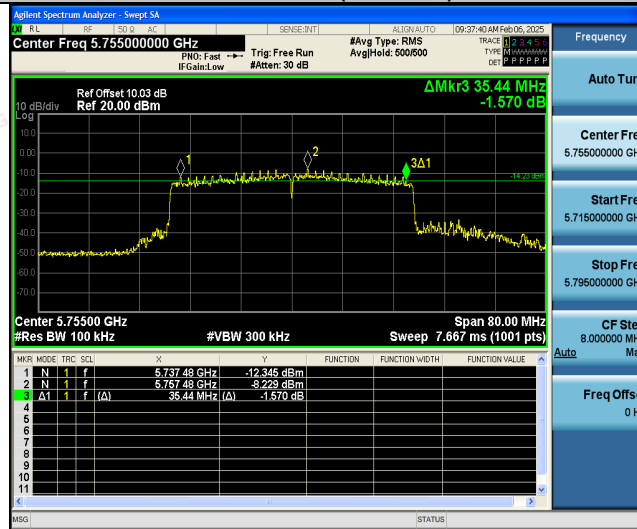
Mid



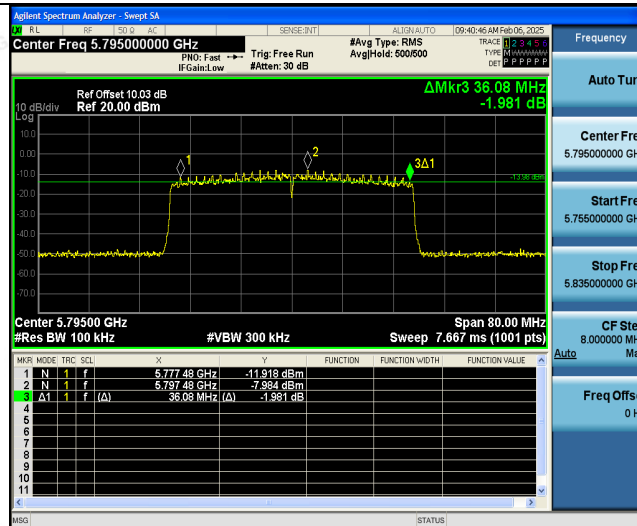
High



802.11be(EHT40)

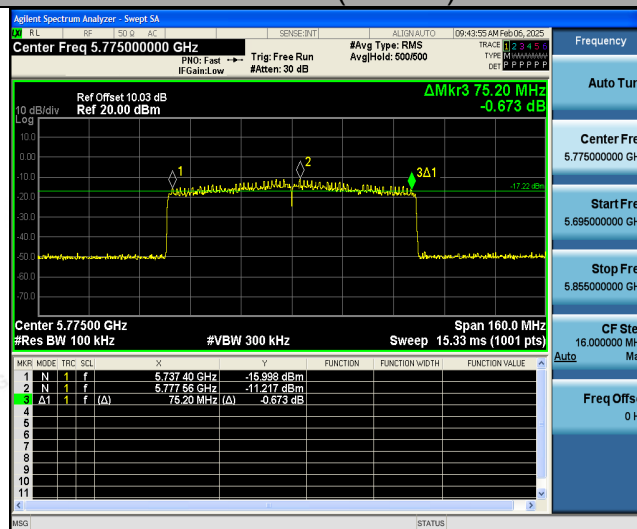


Low



High

802.11be(EHT80)



**ANT. 2**

Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	CH149	5745	15.120	0.5	PASS
802.11a	CH157	5785	15.120	0.5	PASS
802.11a	CH165	5825	15.040	0.5	PASS
802.11n(HT20)	CH151	5745	15.120	0.5	PASS
802.11n(HT20)	CH159	5785	15.120	0.5	PASS
802.11n(HT20)	CH149	5825	15.120	0.5	PASS
802.11n(HT40)	CH157	5755	35.040	0.5	PASS
802.11n(HT40)	CH165	5795	35.040	0.5	PASS
802.11ac(HT20)	CH151	5745	15.720	0.5	PASS
802.11ac(HT20)	CH159	5785	15.080	0.5	PASS
802.11ac(HT20)	CH155	5825	15.120	0.5	PASS
802.11ac(HT40)	CH149	5755	35.040	0.5	PASS
802.11ac(HT40)	CH157	5795	35.040	0.5	PASS
802.11ac(HT80)	CH165	5775	75.200	0.5	PASS
802.11ax(HE20)	CH151	5745	16.080	0.5	PASS
802.11ax(HE20)	CH159	5785	16.560	0.5	PASS
802.11ax(HE20)	CH155	5825	16.040	0.5	PASS
802.11ax(HE40)	CH149	5755	35.040	0.5	PASS
802.11ax(HE40)	CH157	5795	35.040	0.5	PASS
802.11ax(HE80)	CH165	5775	75.200	0.5	PASS
802.11be(EHT20)	CH149	5745	16.040	0.5	PASS
802.11be(EHT20)	CH157	5785	15.920	0.5	PASS
802.11be(EHT20)	CH165	5825	15.800	0.5	PASS
802.11be(EHT40)	CH151	5755	35.040	0.5	PASS
802.11be(EHT40)	CH159	5795	35.120	0.5	PASS
802.11be(EHT80)	CH155	5775	75.200	0.5	PASS

Test plots as follows:

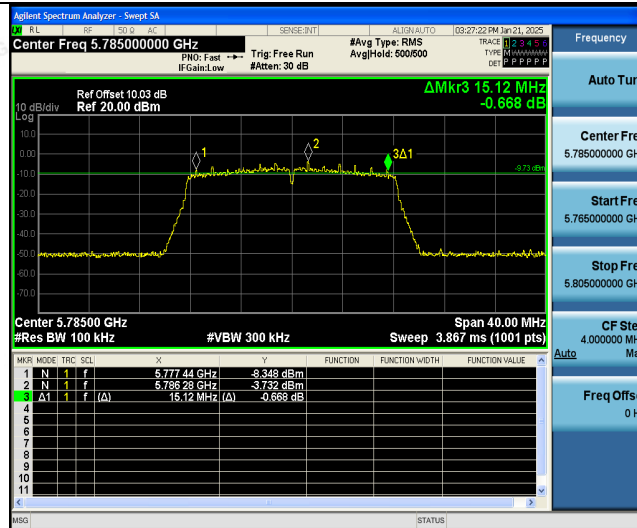


Band IV (5725 – 5850 MHz)

802.11a



Low



Mid



High

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

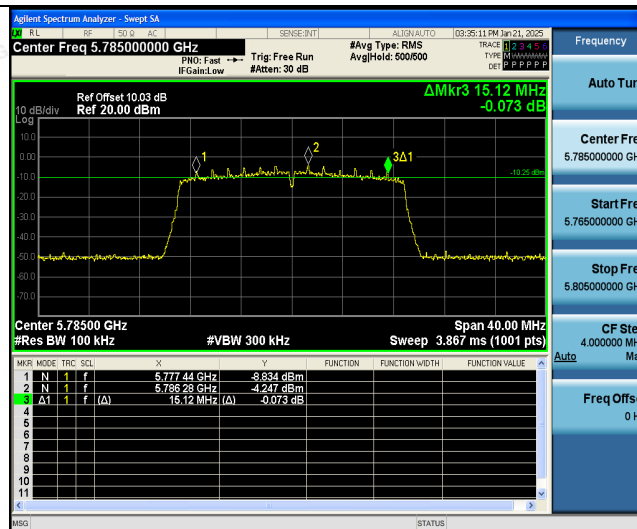
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



802.11n(HT20)



Low



Mid



High

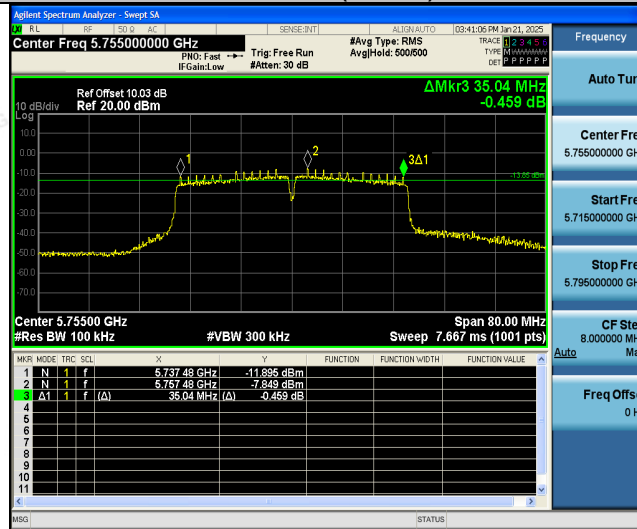
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

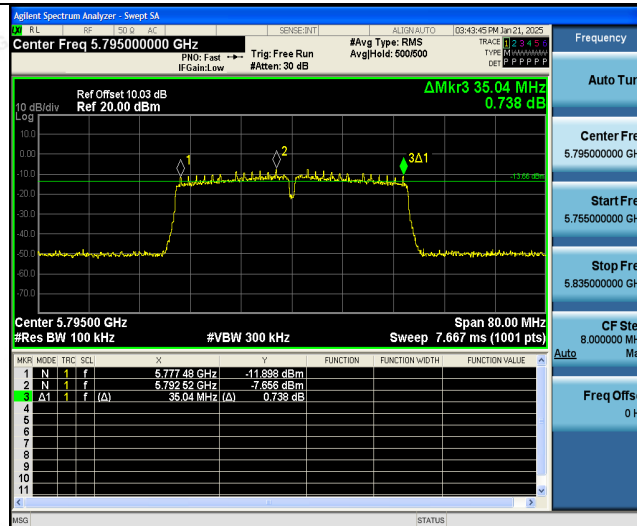
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



802.11n(HT40)



Low



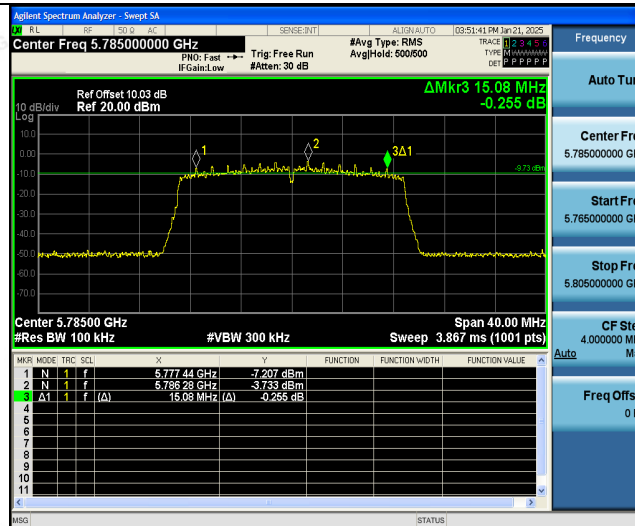
High



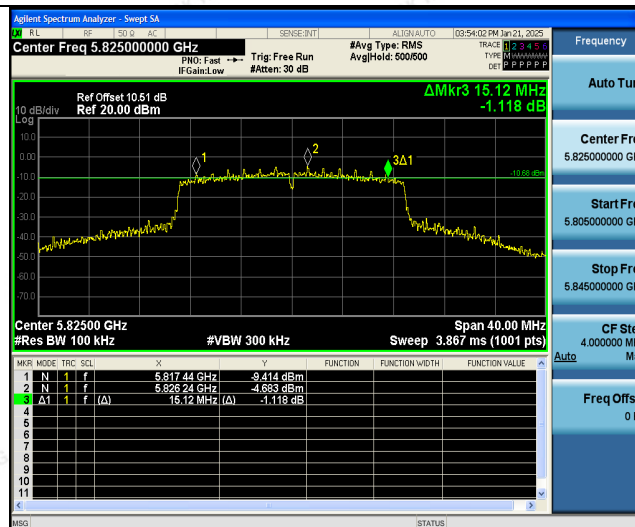
802.11ac(HT20)



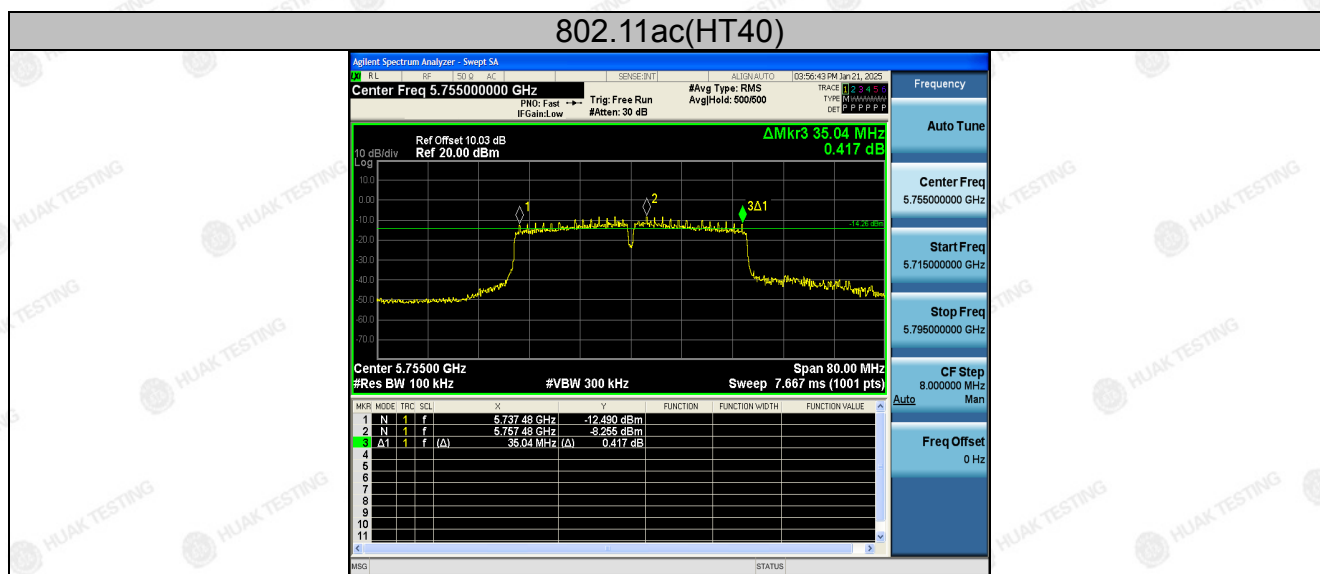
Low



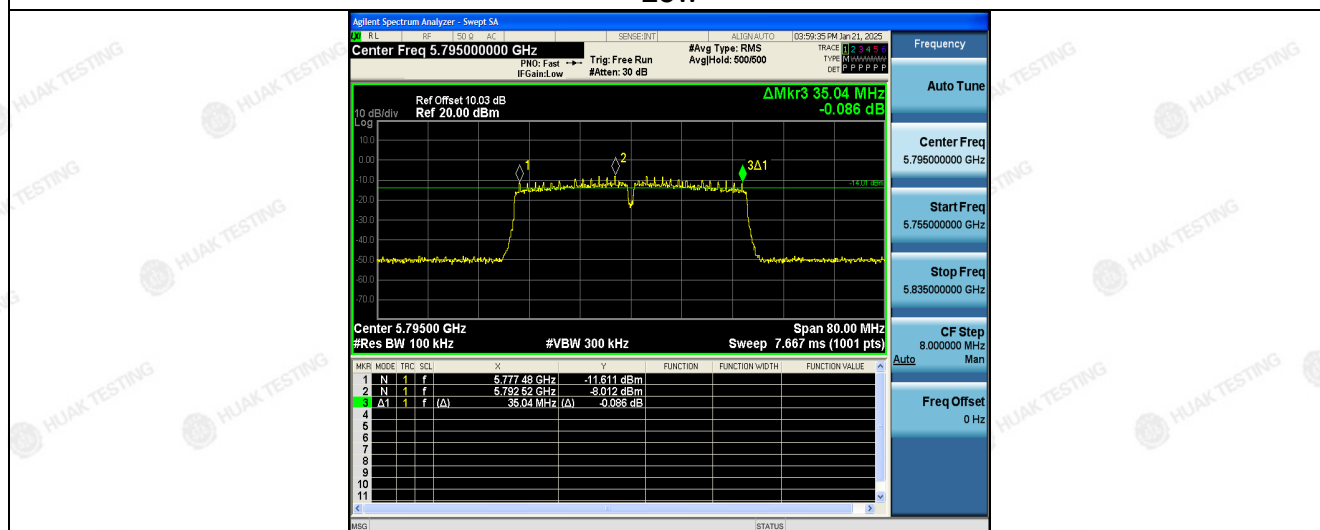
Mid



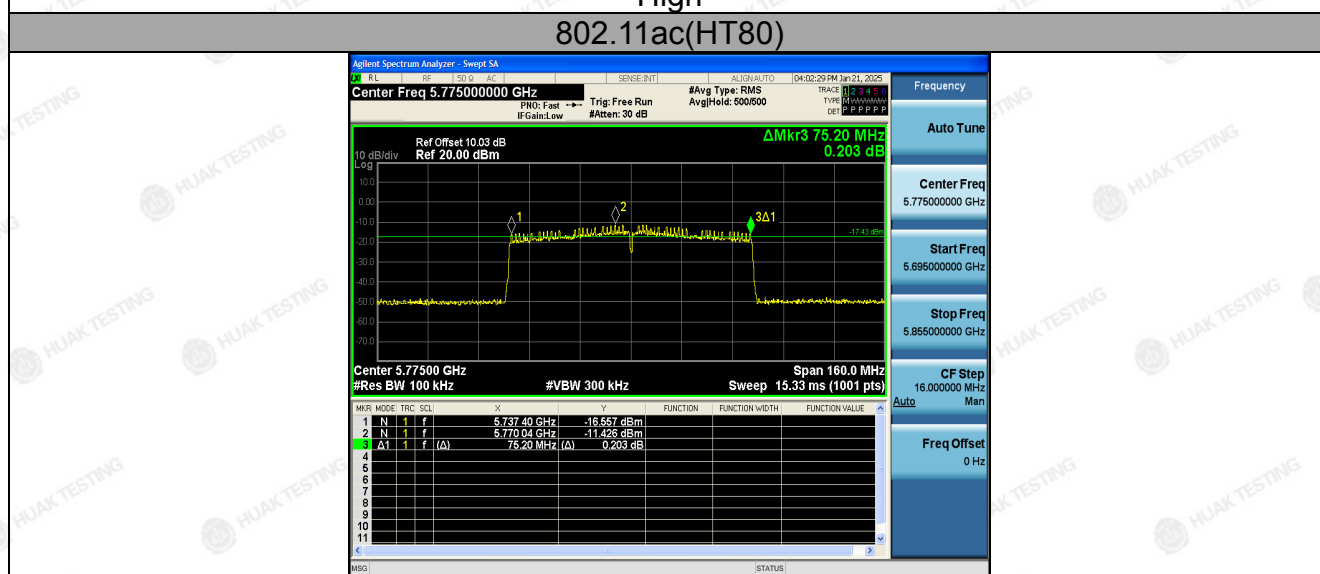
High



Low



High



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

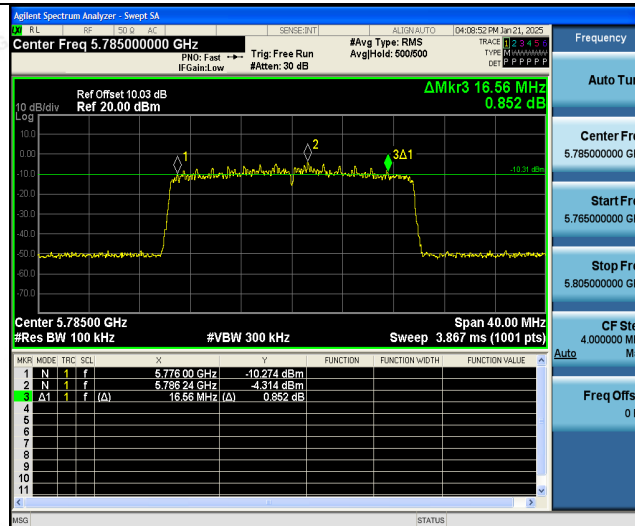
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



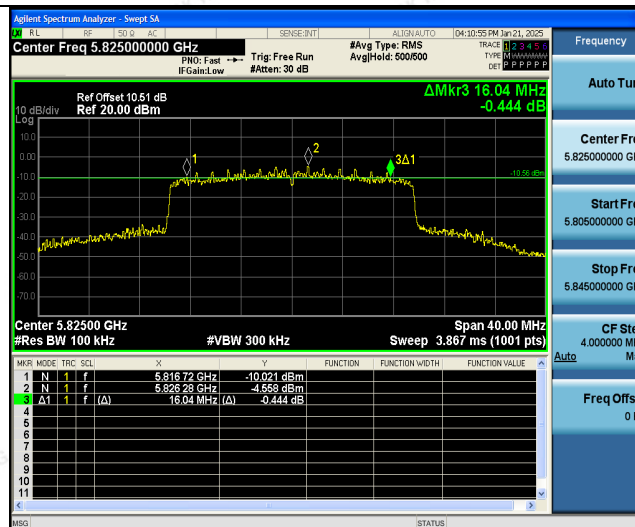
802.11ax(HE20)



Low



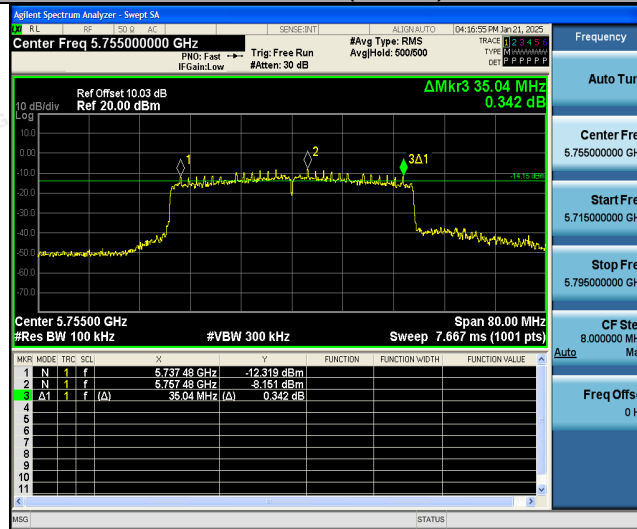
Mid



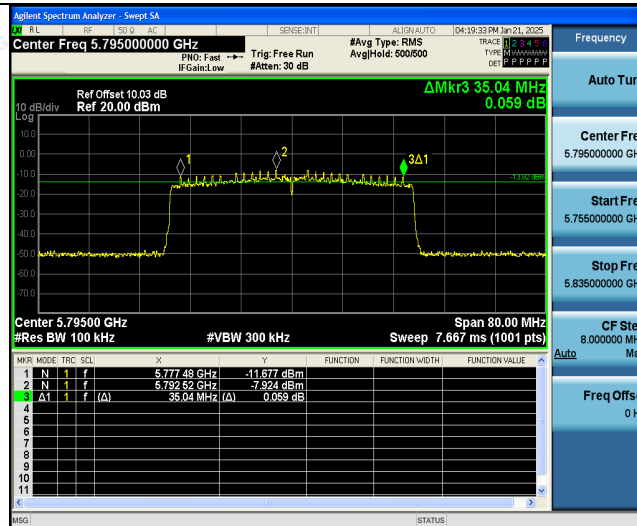
High



802.11ax(HE40)

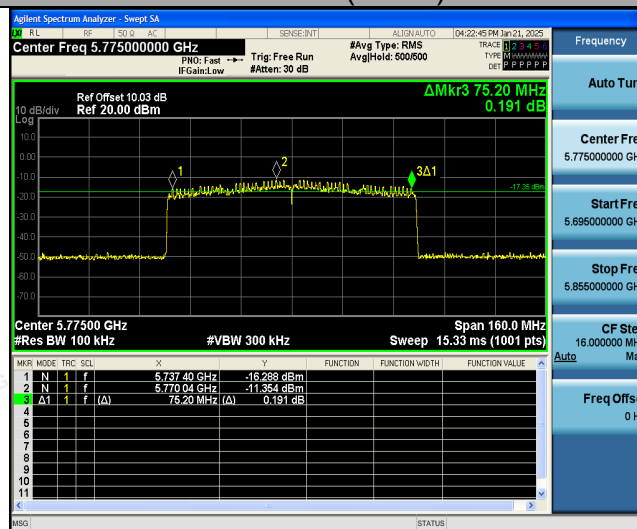


Low



High

802.11ax(HE80)

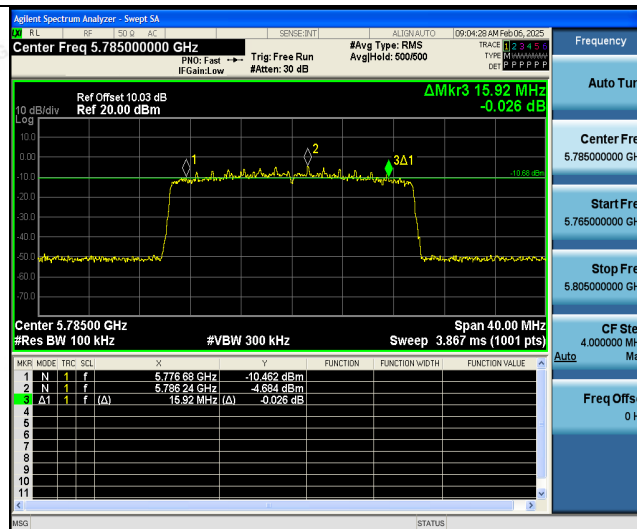




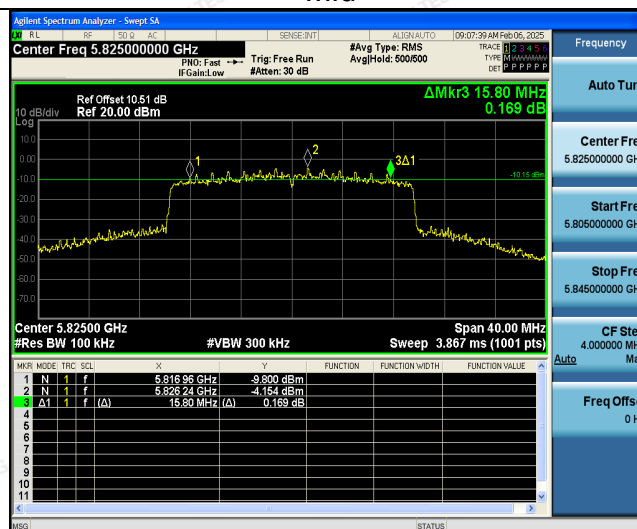
802.11be(EHT20)



Low



Mid



High

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

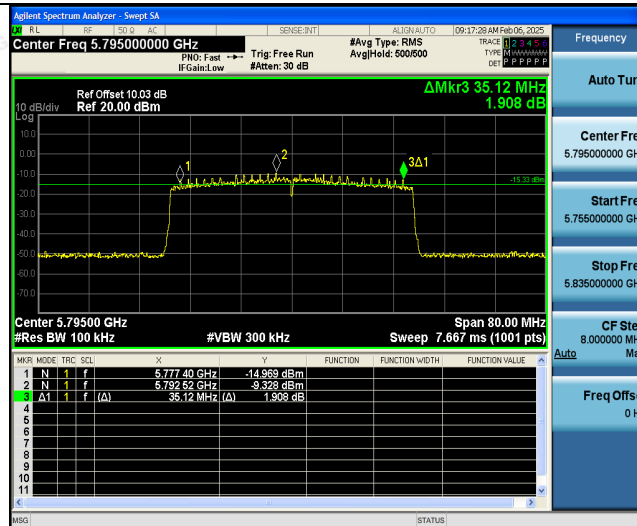
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



802.11be(EHT40)

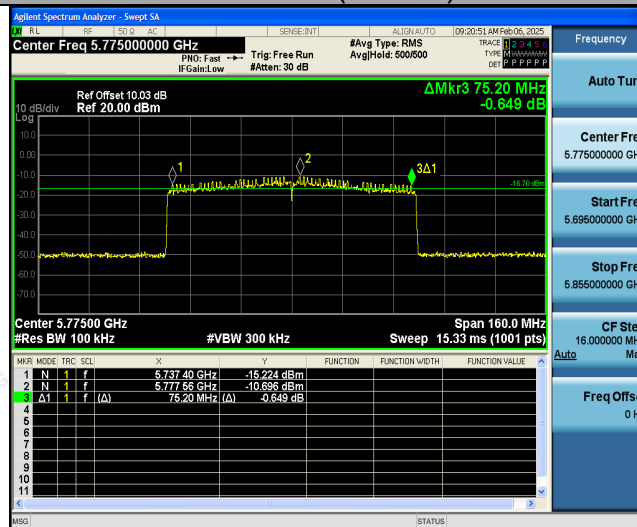


Low



High

802.11be(EHT80)





4.4 26dB Bandwidth and 99% Occupied Bandwidth

4.4.1 Test Specification

Test Requirement:	47 CFR Part 15C Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Limit:	No restriction limits
Test Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth $RBW = 1\% \text{ EBW}$, $VBW \geq 3RBW$, In order to make an accurate measurement. 4. Measure and record the results in the test report.
Test Result:	N/A

4.4.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

4.4.3 Test Result

N/A



4.5 Power Spectral Density

4.5.1 Test Specification

Test Requirement:	FCC Part15 E Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section F
Limit:	$\leq 30.00\text{dBm}/500\text{KHz}$ for Band IV 5725MHz-5850MHz
Test Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth. 2. Set RBW = 510 kHz/1 MHz, VBW $\geq 3 \times$ RBW, Sweep time = Auto, Detector = RMS. 3. Allow the sweeps to continue until the trace stabilizes. 4. Use the peak marker function to determine the maximum amplitude level. 5. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.
Test Result:	PASS

4.5.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.5.3 Test Data

ANT. 1

Configuration Band IV (5725 - 5850 MHz)						
Mode	Test channel	Level [dBm/510kHz]	$10\log(500/510)$	Power Spectral Density	Limit (dBm/500kHz)	Result
802.11a	CH149	0.21	-0.086	0.296	30	PASS
802.11a	CH157	-0.10	-0.086	-0.014	30	PASS
802.11a	CH165	0.73	-0.086	0.816	30	PASS
802.11n(HT20)	CH149	-0.09	-0.086	-0.004	30	PASS
802.11n(HT20)	CH157	0.70	-0.086	0.786	30	PASS
802.11n(HT20)	CH165	-0.18	-0.086	-0.094	30	PASS
802.11n(HT40)	CH151	-3.40	-0.086	-3.314	30	PASS
802.11n(HT40)	CH159	-3.18	-0.086	-3.094	30	PASS
802.11ac(HT20)	CH149	0.42	-0.086	0.506	30	PASS
802.11ac(HT20)	CH157	0.62	-0.086	0.706	30	PASS
802.11ac(HT20)	CH165	0.71	-0.086	0.796	30	PASS
802.11ac(HT40)	CH151	-1.92	-0.086	-1.834	30	PASS
802.11ac(HT40)	CH159	-2.52	-0.086	-2.434	30	PASS
802.11ac(HT80)	CH155	-3.24	-0.086	-3.154	30	PASS
802.11ax(HE20)	CH149	5.95	-0.086	6.036	30	PASS
802.11ax(HE20)	CH157	4.25	-0.086	4.336	30	PASS
802.11ax(HE20)	CH165	5.65	-0.086	5.736	30	PASS
802.11ax(HE40)	CH151	0.18	-0.086	0.266	30	PASS
802.11ax(HE40)	CH159	1.85	-0.086	1.936	30	PASS
802.11ax(HE80)	CH155	-2.64	-0.086	-2.554	30	PASS
802.11be(EHT20)	CH149	3.48	-0.086	3.566	30	PASS
802.11be(EHT20)	CH157	5.31	-0.086	5.396	30	PASS
802.11be(EHT20)	CH165	4.46	-0.086	4.546	30	PASS
802.11be(EHT40)	CH151	0.35	-0.086	0.436	30	PASS
802.11be(EHT40)	CH159	0.89	-0.086	0.976	30	PASS
802.11be(EHT80)	CH155	-1.16	-0.086	-1.074	30	PASS

Note: 1. Power Spectral Density = Level [dBm/510kHz] + $(10\log(\text{Limit RBW/Test RBW}))$

2. Instrument attenuation and cable loss See test diagram

Test plots as follows:

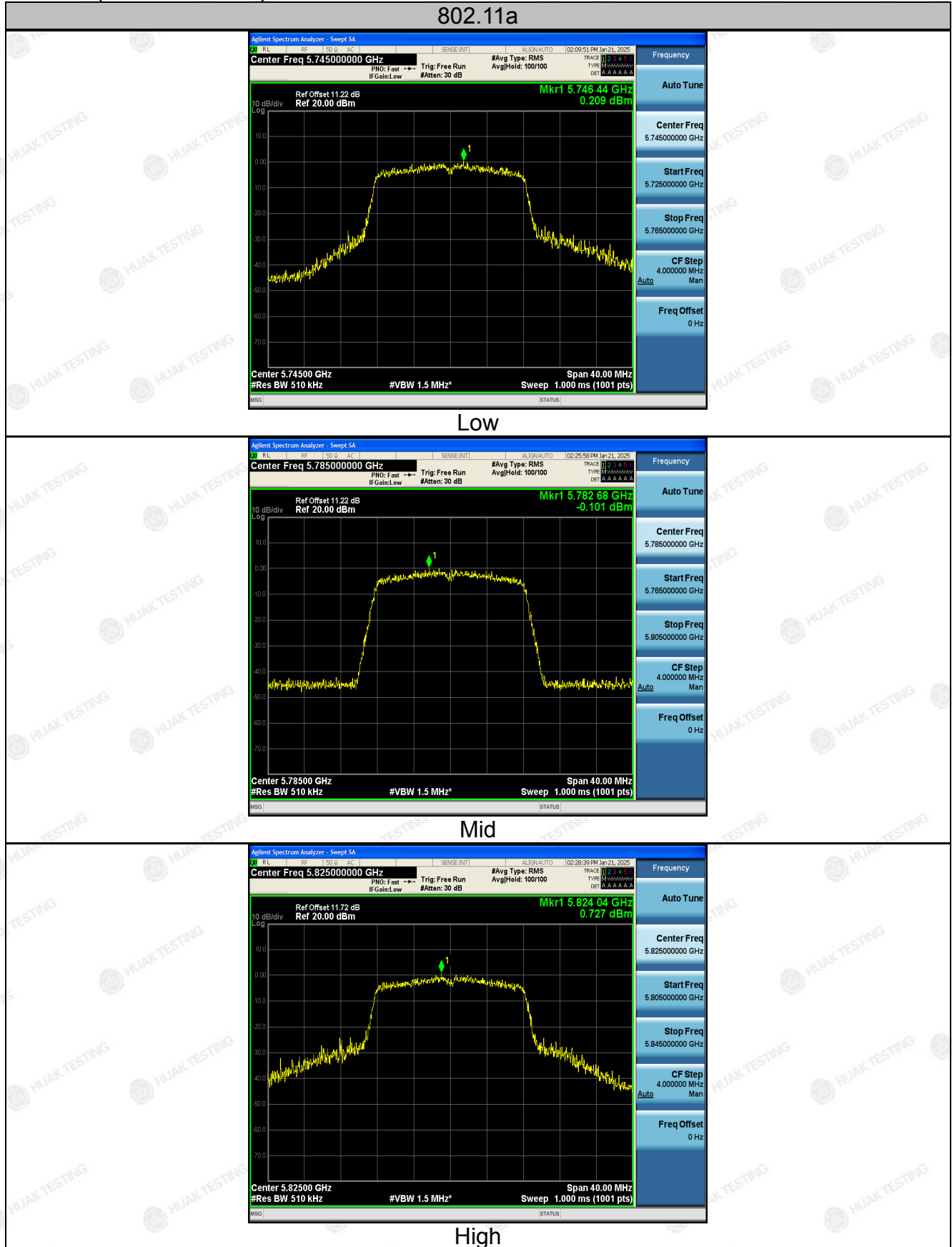
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



Band IV (5725 – 5850 MHz)



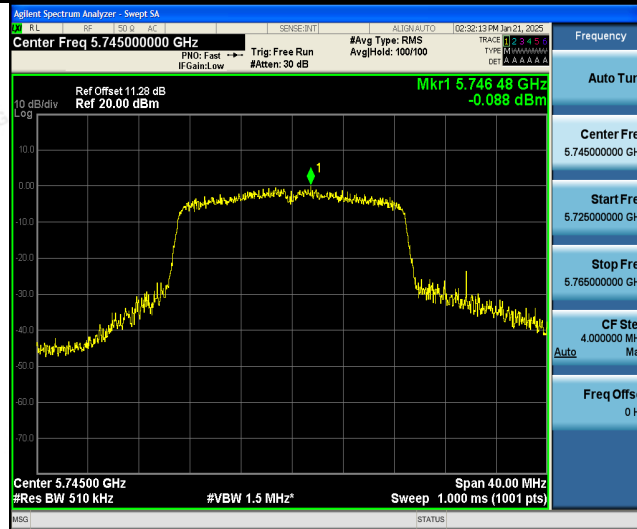
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

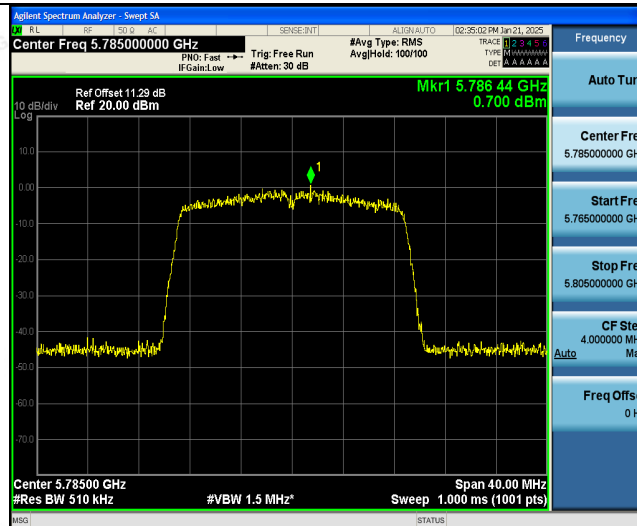
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



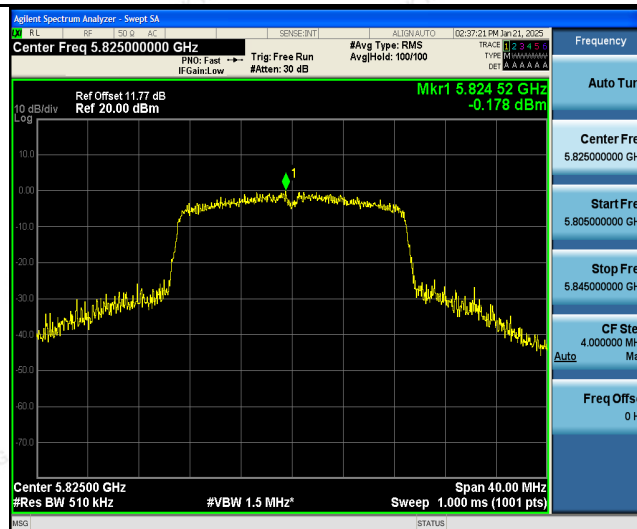
802.11n(HT20)



Low



Mid



High



TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China